

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
LYNDON B. JOHNSON SPACE CENTER**

**JUSTIFICATION FOR OTHER THAN FULL AND OPEN COMPETITION  
PURSUANT TO 10 U.S.C. 2304(c)(1) and  
FEDERAL ACQUISITION REGULATION 6.302-1**

- 1. This document is a Justification for Other than Full and Open Competition prepared by the NASA Lyndon B. Johnson Space Center (JSC).**

- 2. The nature and/or description of the action being approved:**

JSC proposes to contract with the Aerothermal/Aero-optic Evaluation Center (AAEC) at the Calspan University of Buffalo Research Center (CUBRC), by other than full and open competition, for aerodynamic and aerothermodynamic ground testing and data analysis with a 5-year total contract Period of Performance (POP). This contract will support the Space Launch System (SLS) and Multi-Purpose Crew Vehicle (MPCV) development activities. This action will be awarded as a new fixed-price Indefinite Delivery/Indefinite Quantity contract.

- 3. Description of the supplies or services required, include an estimated value:**

NASA requires aerodynamic and aerothermodynamic ground testing efforts consisting of planning and conducting experiments to simulate vehicles in-flight and to understand the environments imposed on flight vehicles. This effort will consist of a series of experimental tests paralleled by computational studies to verify the operation of the facility and ability to achieve desired freestream conditions. NASA requires a facility with the ability to (1) instrument test models with very small and densely spaced instrumentation to measure heat transfer rates, (2) the ability to test at enthalpy levels most representative for a ground test facility, (3) the ability to test at freestream Mach numbers up to Mach 30, and (4) the ability to test very large model sizes, with adequate test duration to allow for flow establishment around the model.

The work can be classified as an environment simulation for SLS launch, SLS launch aborts, and MPCV re-entry. Atmospheric flight simulation could also be provided for other vehicles that are of interest to NASA.

The estimated price of the 5-year POP is not to exceed \$5 million.

- 4. Statutory authority permitting other than full and open competition:**

The statutory authority permitting other than full and open competition is 10 U.S.C 2304(c)(1). As contemplated by the provisions of Federal Acquisition Regulation (FAR) 6.302-1(b)(1)(ii), unique supplies or services may be deemed to be available from only one or a limited number of sources or suppliers with unique capabilities.

**5. A demonstration that the proposed contractor's unique qualifications or the nature of the acquisition requires use of the authority cited:**

CUBRC possesses the ability to instrument test models with very small and densely spaced instrumentation. CUBRC has the instrumentation and facilities required, including sophisticated machining and equally unique miniature delicate instrumentation, to construct these models. Many of the tests involve replicating models or instrumentation that were previously constructed by CUBRC. The AAEC at CUBRC can meet this requirement for small and densely populated instrumentation development. For example, during the Manned Heating-13 Orbiter heating test, CUBRC instrumented the model with thin-film "button" heat transfer gauges as small as .05 inches. Other thin-film "ladder" gauges had lengths of approximately .028 inches and widths of .003 inches.

Conventional wind tunnels throughout the country are "cold flow" tunnels, meaning they have low enthalpy within the flow. However, the AAEC at CUBRC includes facilities that can match or closely match a larger portion of a re-entry vehicle trajectory than any other conventional facility. This will allow NASA to test enthalpy levels most representative for a ground test facility.

The ability to test at or as close as possible to the right Mach, enthalpy, and model scale (Reynolds number), provides the best simulation of the expected flight environment and thus minimizes extrapolation errors and requisite conservative margin that must be incorporated to cover these errors. This is especially important for studying the performance of the backshell of re-entry vehicles such as the Multi-Purpose Crew Vehicle (MPCV). The size of the CUBRC facility (diameter of the tubes that drive the flow) is sufficient to ensure adequate test duration.

Freestream Mach number is a measure of the speed of a vehicle in relation to the speed of sound. The facilities at CUBRC represent one of only two known facilities in the United States able to test at free stream Mach numbers of 30 or higher. Testing at Mach numbers up to 30 meet MPCV project requirements to obtain, for example, gas-radiation measurements to obtain data needed for ensuring safe flight through the Earth's atmosphere at very high speeds as well as characterization of other planetary atmospheres at similar or higher speeds.

While all facilities need to scale actual flight vehicle geometries to fit within the test section, CUBRC can test launch vehicle configurations up to 30 feet in length. The ability to test such large models allows for more accurate measurements and applicability at flight vehicle scale.

While a handful of other testing facilities may have one or more of the unique capabilities listed above, the CUBRC facilities are unique in that they possess all of the required capabilities. The facility has demonstrated its ability to accommodate test requirements for the Space Shuttle and Constellation Programs as well as other proposed space transportation and Department of Defense programs.

**6. Description of the efforts made to ensure that offers are solicited from as many potential sources as practicable:**

A synopsis of this action was posted on the NASA Acquisition Internet Service on March 7, 2011, to notify industry of this non-competitive action. The synopsis closed on March 21, 2011, and no responses were received.

**7. Determination by the contracting Officer that the anticipated cost to the Government will be fair and reasonable:**

The Contracting Officer will establish a fair and reasonable price by obtaining appropriate data for evaluation per FAR 15.402. The price to the Government will be determined by negotiated tasks/delivery orders under the contract. Prices specific to task/delivery orders will be reviewed to reflect a fair and reasonable price.

**8. Description of the market survey conducted, and the results, or a statement of the reasons a market survey was not conducted:**

The Contracting Officer's Technical Representative (COTR) has been involved with or managing the aerothermal efforts for the Space Shuttle Orbiter for the last 7 years. During this timeframe, he has been in contact with numerous testing facilities. In addition, he has attended several technical conferences and has performed Internet research in an attempt to understand available capabilities at other testing facilities around the United States. In reviewing their capabilities, he has not found any facilities that meet all of the requirements previously identified. Through this market research, no other companies have been identified that can meet the requirements.

**9. Other facts supporting the use of other than full and open competition:**

CUBRC facilities are unique in that they possess all of the required capabilities of this contract. The facility has demonstrated its ability to accommodate test requirements for the Space Shuttle and Constellation Programs as well as other proposed space transportation and Department of Defense programs.

Any course of action other than awarding to CUBRC, Inc., would not fulfill the Agency's requirements, and therefore, is not in the best interest to the Government.

**10. Sources, if any, that expressed an interest in writing the acquisition:**

No sources expressed interest.

**11. The actions, if any, the Agency may take to remove or overcome any barriers to competition before any subsequent acquisition for the supplies or services required:**

This Agency will continue to remove or overcome any barriers to competition before any

subsequent acquisition for these services are required. To do so, the procurement offices will coordinate with the COTR to ensure any needs for publicizing formal Requests for Information and sources sought synopses are met. These postings will enable the COTR and technical community to gather crucial information regarding the options and available sources for the future testing needs of the Agency. The technical offices and COTR will continue to monitor industry capabilities by attending related seminars and industry forums. The COTR will also continue to review relevant technical journals, Government and commercial data bases, and internet resources for relevant information.

Technical Officer: I certify that the supporting data presented in this justification are accurate and complete.




Brian P. Anderson

Contracting Officer's Technical Representative

3/28/11

Date

Contracting Officer: I hereby determine that the anticipated cost to the Government will be fair and reasonable and certify that this justification is accurate and complete to the best of my knowledge and belief.



P. Lamar Mueller

Contracting Officer

3-28-11

Date

Concurrence:



Debra L. Johnson

Procurement Officer

4/15/11

Date

Approval:



Ellen Ochoa

Center Competition Advocate

4/21/11

Date